SHALEFIELDS GRASSROOTS REPORTER

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Canaries in a coal mine?

Warnings from residents of southwestern Pennsylvania's gas fields

WASHINGTON COUNTY RESIDENT WALT DANNA'S WATER TASTES BETTER THAN $1-A-BOTTLE WATER AND HE IS AFRAID OF LOSING IT LIKE SOME NEIGHBORS HAVE. AFTER DRILLERS LEAVE, "THEY'LL BE GONE, THE GAS IS GONE, AND YOU'RE STILL HERE..." (PHOTO: ANNE DEFAZIO)

By Ben Fiorillo

In the few years since drilling began in the Marcellus Shale, Washington and Greene counties have seen more drilling than nearly any other part of Pennsylvania. In 2010 alone, over 200 Marcellus wells were drilled in the two counties, which form the southwestern corner of the state. At least another 500 wells have been permitted. Communities here are in the thick of the Marcellus gas rush and for many it has been an assault on their homes and their health.

Greene County native Ken Gayman is the vice president of the Mon-Yough chapter of the Society for Pennsylvania Archaeology. Concerned about the impacts some drilling operations were having on state historical sites, he started to investigate further.

From friends and neighbors living closer to Marcellus wells he heard about conditions around the drilling sites: constant noise from machinery and truck traffic, floodlights running through the night, farms being torn up by heavy equipment.

It got worse; people living near gas wells were getting sick. Pets were dying and farmers were losing livestock. Drilling, he found, was not only threatening the area's past, but its very future.

One family Ken knows started having health problems shortly after a Marcellus well was drilled next to their home in the summer of 2009. Their 14 year old boy had recurring abdominal pain, swollen lymph nodes, sore throat and episodes of amnesia.

The mother and daughter had symptoms too, though less severe: headaches, fatigue, rashes. After several trips to the hospital and appointments with a number of specialists, they still could not get any answers.

Then, late last summer a number of animals in their community got sick and died, including the family's dog and goats. When their family doctor heard about the animals he called them in for a toxicology screening. They all had high levels of arsenic in their blood.

A preliminary test found elevated levels of arsenic in their well water. The chemical likely entered their water when the aquifer was disturbed during drilling.

There was something happening in the air too. "These condensate tanks and compressor stations all emit neurotoxins" Ken says, referring to the facilities which pull out liquids from the gas and push it through the pipeline. Folks living near these, which are known for releasing hazardous air pollutants[1], were getting headaches, sore throats, nosebleeds, and worse.

"Kids are on blood pressure medications, seizure medications, asthma medications," Ken explains, "It just keeps goin' on and on and on, and the more you get involved with it, the more you hear about the illnesses that these people are experiencing."

Natural gas production in Pennsylvania is not new, but the process involved in drilling in the Marcellus shale - and the pace and scale at which the industry is developing - are unlike anything the region has seen before. Only with recent developments in drilling technology using hydraulic fracturing has production in the Marcellus become economical (see "Drilling Process"). These techniques, along with a surge in natural gas prices in the last decade have driven the drilling frenzy that is gripping communities like Ken's.

Many of the companies drilling in the Marcellus are from out of state. They have come from places like Texas where horizontal hydraulic fracturing was pioneered in the Barnett Shale.

Folks here wonder if they plan to stick around. Walt Danna lives next to a Marcellus well operated by Range Resources near West Middletown in Washington County.

A DRILLING PAD (TOP LEFT) AND HYDROFRACKING SLURRY POND DWARF A NEARBY HOME. TOXIC FUMES POSE AN OBVIOUS DANGER TO THE RESIDENTS. (PHOTO: STEVE WHITE/MARCELLUSPROTEST.)

"When this is done," he says, "they'll be gone, the gas is gone, and you're still here... They're not living here because this is the Garden of Eden; they're living here because they're exploiting us."

Some people have other reasons for distrust. The mother of the family who had arsenic poisoning, who preferred not to be identified, says that the company told her a far different story than the one she now knows.

"We were told that they would come in, drill, take the gas out, cap the wells off, and put everything back to the way it was before... [They] make it look so easy...we didn't realize all of the other things that went along with the drilling."

According to Ken, the PA Department of Environmental Protection (DEP), which has regulatory power over the industry, has been negligent. The agency granted thousands of permits before the risks of this type of drilling were fully known, he explains, and now that problems are coming up they are looking the other way.

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What does hydrofracking mean for us?

By the Shadbush Collective

Industry spokespersons and politicians have painted a picture of shale gas drilling as a 'golden opportunity' for the entire region. They've boasted about thousands of new jobs, dangled the lure of instant wealth for landowners who sign leases, and even argued that drilling is patriotic because it will reduce our dependence on energy from overseas. However, independent examination suggests many of these claims are exaggerated, and that the costs to our health may be substantial.

Life at ground zero

Residents of areas where drilling has begun are already experiencing alarming problems. Although the industry says it is impossible, permanent contamination of well water is now a fact of life for many. Strange new health problems are cropping up in children and adults who have been exposed to contaminated water and air.

Only a fraction of these cases ever become public, because companies often settle problems by offering immediate financial compensation if the people who have been affected will sign agreements promising not to speak about their problems. Many did not anticipate the profound disruption to their quality of life from lights, noise, and traffic at all hours. They've been kept up at night as compressors and other drilling equipment grind around the clock; they have seen roads destroyed by the thousands of heavily loaded trucks running to and from every single frack site. Many are also finding that hidden clauses in their leases mean their financial gain is far less than advertised, even as their property values are unexpectedly compromised.

Although contamination does not occur at every well site, and not every landowner is shortchanged, it is safe to say that the problems that have come to light so far are only the tip of the iceberg. Over 7,000 wells have already been permitted in Pennsylvania, only 2,500 have yet been drilled, and 60,000 more are planned for the future as the gas rush plays out [1].

Impacts felt throughout the region

Rural residents and leaseholders are not the only ones who will be impacted. The millions of people in New York City, Philadelphia and Pittsburgh and across the many states impacted by drilling all rely on drinking water supplies that flow in from the Hudson, Delaware, Allegheny and other affected watersheds. Millions of gallons of wastewater have legally been disposed of into these drinking water sources without being fully tested or treated for contaminants; illegal dumping, spills, and groundwater pollution add to the rivers' burdens. Widespread drilling will also significantly increase air pollution throughout the region. While air pollution is often invisible, its effects on health are insidious, increasing childhood asthma, many cancers, and heart disease deaths]. Whose child will live in fear of not being able to breathe, whose father will die before his time of a heart attack on an especially smoggy day?

Drilling at the predicted massive scale will profoundly change our state's landscape of rolling farmland and wild forests, treasured by both rural and urban residents for hunting, fishing, and quality of life. It damages the landscape's potential for sustainable economies in farming, timber, and recreation: who can farm with poison water, and who wants to vacation in an industrial landscape? Even as local food sources are becoming increasingly important, as they were for previous generations, we risk contaminating the farmland that provides this life-giving bounty.

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- *Hydrofracking's impact on land and water*
- *Chemicals and community health*
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The real economics of natural gas drilling

By Jessica McPherson

While proponents of Marcellus gas drilling argue it will bring a much-needed economic lift to depressed areas in rural Pennsylvania, they're not looking at the full picture. The promised gains are often overstated[1], many hidden costs are not accounted for, and the industry is inherently short-term.

When gas drilling leases are signed, land owners often receive both a signing bonus and royalties, but many do not realize that hidden fees and severe damage to their land can not only cut into their payments, but significantly devalue their property in the long-run if water supplies are damaged, roads are left in disrepair and air quality is degraded.

The thousands of jobs promised by the industry have not materialized; instead, legions of out-of-state workers have temporarily moved into our communities. Many drilling jobs available to locals are contract positions - not sustainable careers that a family can count on for long-term employment. One well takes approximately 2 months to drill. After that only a few workers are needed to maintain the huge swaths of wells and pipelines.

A recent Keystone Research Center report found, "The number of jobs created by Marcellus industries is small — less than 10% — compared to the 111,400 increase in jobs in all state industries since Pennsylvania's recent employment trough [low point] in February 2010." [2]

Additionally, drilling jobs can be extremely dangerous, involving toxic chemicals and potential for deadly explosions. On June 7th, 2010, a well in Moundsville, West Virginia burned for hours with 70' high flames after drillers hit a pocket of methane from an old coal mine. Seven workers were life-flighted to Pittsburgh. On February 3rd in Avella, Pennsylvania, 5 frack fluid tanks caught on fire in an explosion, injuring three workers.

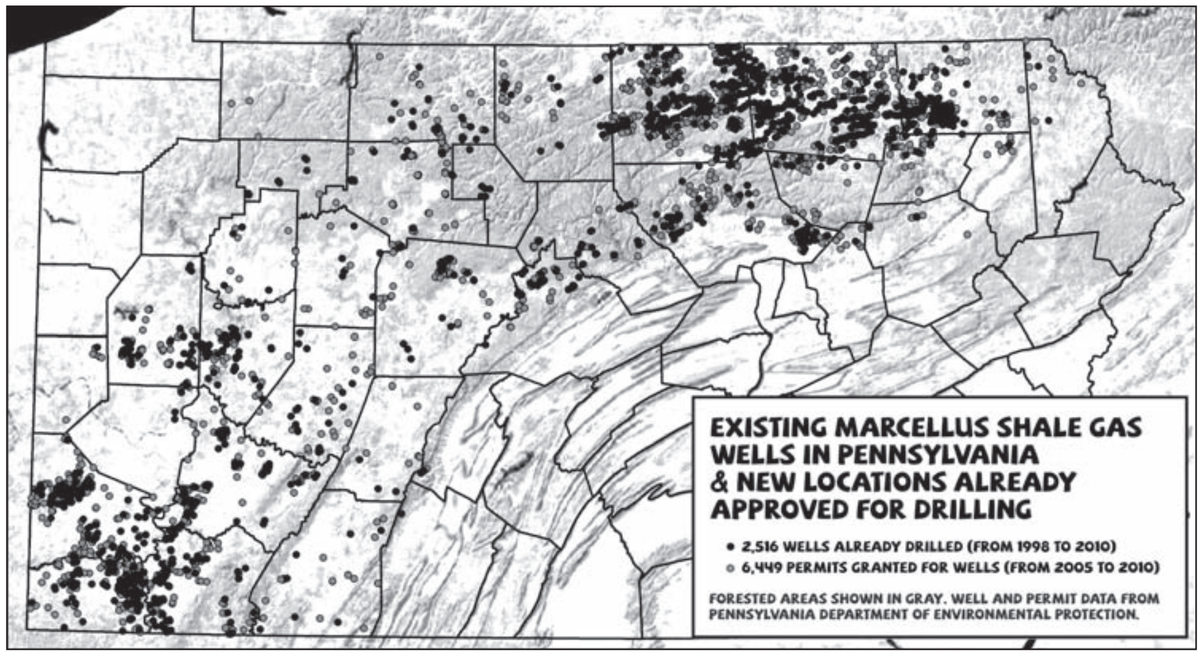
Drilling companies are fiercely anti-union, and many require workers to go to special company doctors. Under these conditions, workers have little power to stand up for their own safety. For example, a lawsuit brought by workers who were severely injured during the Avella fire alleges that Chesapeake Appalachia company "consciously disregarded commonly accepted industry standards and deliberately exposed the plaintiffs to conditions that could and did cause serious injury," and further states this is common throughout the industry due to the lack of regulatory oversight.[3]

The boom and bust economy that often results from intensive resource extraction can impact rural communities in unexpected ways. The influx of out of state workers causes prices for local goods and services to spike. Rental housing prices go up, and housing shortages are common. In north-central PA towns like Bradford, residents are already seeing these effects. Furthermore, crime rates can increase and social services are stretched. Pennsylvania's roads and bridges are aging, and not designed for the massive volume of truck traffic this industry brings; repairs are a cost taxpayers bear for the industry.

However, rural communities do not get any tax money from drilling companies. Even as the state budget is in crisis, drilling companies take advantage of tax loopholes to pay far less than they do in other states[4]. Because there is only a minimal bond requirement, companies are also able to duck out of paying the people back for the lingering damages they cause to land, infrastructure and health. Companies are required to post only $25,000 bond for as many wells as they want to drill; plugging a single well costs four times that amount.

In the long view, the economic model of Marcellus drilling is a recipe for poverty. Large companies based outside the region extract the gas, ship it away, and make huge profits; the local windfall is short-lived, and when it comes time to pay for any problems, the companies are gone. Pennsylvania has already lived through this pattern with coal mining; the question of who will clean up the acres of damaged land and miles of damaged streams is still unanswered.

All across Appalachia, there is a clear link between dependence on extractive industries and long-term poverty: the counties that depend most heavily on coal jobs for their economy, and produce the most coal, now also have the highest percentage of residents on food stamps and welfare[5]. While those that do have jobs get by, more people don't have jobs, and the jobs are not long-term. Like coal mining, Marcellus drilling impedes development of other more sustainable rural industries such as farming and tourism. At the same time, it creates additional costs to individuals and the state for healthcare, pollution clean-up, land degradation, water treatment, road repair and more.


EXISTING MARCELLUS SHALE GAS WELLS IN PENNSYLVANIA & NEW LOCATIONS ALREADY APPROVED FOR DRILLING
• 2,516 WELLS ALREADY DRILLED (FROM 1998 TO 2010)
◦ 6,449 PERMITS GRANTED FOR WELLS (FROM 2005 TO 2010)
FORESTED AREAS SHOWN IN GRAY. WELL AND PERMIT DATA FROM PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Canaries in a coal mine?

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Agency officials have told Ken that they cannot prove that drilling contaminated groundwater without a baseline test showing that a well's water was safe before. They also maintain that nothing has turned up in their air quality tests around compressor stations. . However, residents report that operators turn down the facilities when the DEP shows up, and air quality advocates argue that the DEP's methods have been faulty[2].

Fed up, Ken and others are organizing. People are acquiring equipment for air and water monitoring. Others are organizing a team of people to reach out to impacted households, connect them to medical and legal resources and document their illnesses.

They hope that with a survey of people in the most affected areas, they can build a case showing the correlation between drilling and illness that neither the industry nor the DEP can dispute.

To Ken, it's a start. But he knows what they're up against and he doesn't see any relief coming from above. "They're all bought off big by the gas industry" he says of state officials.

At an organizing meeting outside of Washington, PA a woman working with Ken to organize the outreach team draws an ominous analogy for the situation here: "We're in the coal mine, and the canaries are dying."

If the problems in Washington and Greene counties are any indication of what's to come for the rest of the state, then Pennsylvania has a disaster on its hands.

What does hydrofracking mean for us?

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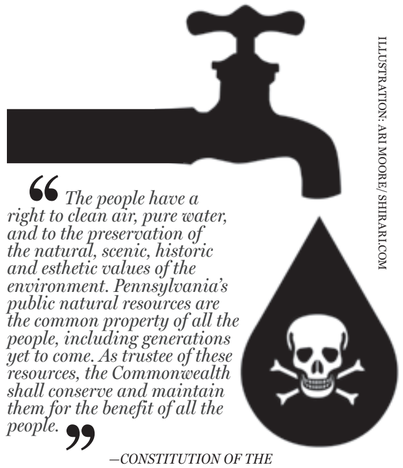
Path to energy independence?

Industry argues that the gas will free us from foreign energy sources, with the added benefit that natural gas is clean and green. However, the same energy gains can be made through concentrated effort to increase efficiency and conservation, which also creates thousands of jobs, and leaves a more sustainable legacy for future generations. Furthermore, plans are in development for new infrastructure to transport the gas overseas for sale.

Natural gas from shale beds may not even deserve its green reputation. While natural gas does burn cleaner than coal, new calculations demonstrate that because so much energy is used to extract gas from shale beds, and so much carbon dioxide and methane are released in the process, its greenhouse gas footprint may be equal to coal's when the full lifecycle of production is considered [2, 3].

Communities at a crossroads

There is a large supply of natural gas trapped in the shale, but if it comes at the price of our health and our region's long-term prospects, is it worth it? What legacy will it leave for our children, and can we do better? Our communities must decide; although the doors have been thrown open for the industry, many people across the region are asking questions, organizing to make their voices heard, and together we can be a powerful force for true democracy.



"The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."

—CONSTITUTION OF THE COMMONWEALTH OF PENNSYLVANIA

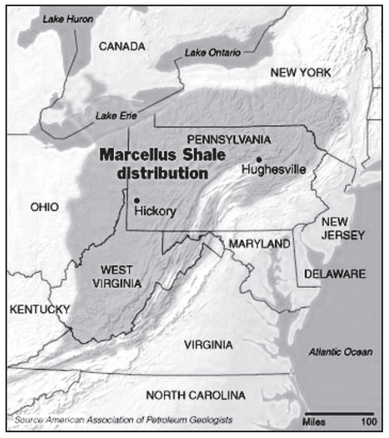
ILLUSTRATION: ARI MOORE/ SHIRARI.COM

Understanding Marcellus Shale natural gas drilling and its impact on our people, land, air and water

By Ben Fiorillo, Jessica McPherson, Virginia Paul, and O'Ryan.

What is Marcellus Shale?

Marcellus Shale is a large formation of sedimentary rock that sweeps through approximately 95,000 square miles of the Eastern United States and Canada. The shale was formed almost 400 million years ago when the region was covered by shallow seas, and contains large amounts of salt, iron, pyrite, heavy metals, and uranium, as well as pockets of natural gas. Because this gas is dispersed throughout the shale formation, extraction companies have begun using a new technology called slickwater hydraulic fracturing to extract the gas deposits[1].



Marcellus Shale Gas Drilling—"Not Your Daddy's Gas Well"

Drilling for gas in the Marcellus Shale requires a much more intense industrial operation than the conventional gas wells that have been drilled in Pennsylvania for the past several decades. The wells are extremely deep (approximately 2 to 9 thousand feet) and can be drilled horizontally through the shale for up to a mile. These wells require more equipment and produce more drilling waste. In addition, the slickwater fracturing technique requires millions of gallons of water and tons of chemical additives, which must all be hauled to the site and stored in tankers[1]. Well pads and associated roads must be larger to accommodate all the equipment.

Hydraulic fracturing, often called "fracking" or "hydro-fracking," is the process of injecting water and sand into a well at high pressure to fracture the surrounding rock and allow the gas to flow out. The slickwater technique adds many chemicals to the water reduce the friction of the water with the rock[1]. Slickwater hydraulic fracturing is currently the only way to drill Marcellus wells economically. The fracking of a single horizontal well uses 3 to 5 million gallons of fresh water and an average of 1,000 semi-truck trips to complete[1, 2, 3]. A single well can be re-fracked multiple times and can remain active for up to 40 years.

Marcellus drilling requires other infrastructure. Containment ponds are often constructed on site to store the wastewater. Leases may include clauses permitting the gas company to use water sources on your property, such as streams, ponds, or springs. Because raw gas must be refined before transportation, condensate tanks and other industrial structures for storing gas and separating it from water and impurities must also be installed on the property. Concentrations of wells require a compressor station and pipeline corridors to transport the gas. Finally, property owners who lease don't even get free gas, because raw Marcellus gas burns at too high of a temperature and pressure for residential use. [3]

Threats to Our Water Supply

The safety of our drinking water—whether from groundwater wells or surface rivers and streams—and the health of our environment is in jeopardy, both from industrial scale water withdrawal and water contamination. The fracking process uses an enormous amount of water, many dangerous chemicals are added in order to make fracking fluid, and additional toxic substances from deep in the earth are forced to the surface in flowback water after fracturing.

Where Will All the Water Come From?

Horizontal hydraulic fracturing operations often use over 5 million gallons of water per well. This water must be acquired from nearby waterways, which can be damaging to ecosystems[4, 5]. According to the Argonne National Laboratories 2010 report, "if the number of Marcellus wells continues to rise rapidly, water supplies could become a barrier" [6].

Groundwater Contamination

Although cement casings are installed around wells to prevent the escape of frack fluid and flow-back water into the groundwater, well water contamination resulting from drilling is nonetheless common [7]. Pennsylvania allowed Marcellus drilling to begin without any regulations in place for cement casings[8]; in October of 2010, the DEP finally adopted new regulations. The Sierra Club, which was part of a coalition that submitted detailed technical comments written by an engineer [9], calls the new regulations "significantly safer" but also says they "still leave important concepts undefined and lack some important protections" [10].

Furthermore, the casings may not be enough; they are deliberately punctured in the Marcellus shale layer to extract the gas. Natural fissures exist between the Marcellus shale and the layers above that can be up to a mile long, and hydraulic fracturing enlarges these crevices[11]. Casing problems and natural fractures create underground pathways for all of these chemicals, along with natural gas and methane, to migrate through to aquifers and into wells. This leakage is the cause in many of the cases of people who are sick from their well water, or who can light their well water on fire when it flows from their tap.

About fifty to eighty percent of the fracking fluid pumped into the well is not recovered and stays underground. As liquids and gases naturally move around underground, often slowly, contamination resulting from fracking can take years to reach drinking water supplies.

Where Does All the Wastewater Go?

Marcellus drilling has been allowed to proceed for several years, with increasing thousands of wells permitted, with no provisions in place to deal with the massive volumes of toxic wastewater produced by hydrofracking. Until May 2011, the industry was legally dumping massive volumes of untreated wastewater into Pennsylvania's rivers and streams. No other state where fracking occurs uses its waterways as the primary means for wastewater disposal [12, 13].

The DEP initially said that this disposal was safe, but in the face of mounting evidence that it posed risks to drinking water supplies [13, 14, 15], finally asked drillers to voluntarily cease disposal of untreated fracking fluid into surface waterways. Authorities have still not acknowledged the full breadth of the problems associated with wastewater. The DEP has no comprehensive system in place to track wastewater disposal, and does not require companies to fully disclose its composition.

Twenty to fifty percent of the fracking fluid flows back up the well. In addition to toxic fracking chemicals, after exposure to the rock in the Marcellus formation this flow-back water now contains: radioactive elements; metals, including toxic heavy metals; high levels of mineral salts (Total Dissolved Solids or TDS); and toxic organic compounds such as benzene and toluene [13, 15, 16, 17]. Its salt concentration is 6-10 times greater than seawater.

The flowback water is temporarily pumped into waste pits near the well pad that are lined with plastic. This waste fluid and all of its contaminants can seep into the ground through rips in the liner, and can overflow onto nearby land and into streams. Wildlife and livestock mistake waste pits for ponds and wetlands, and are attracted to the waste

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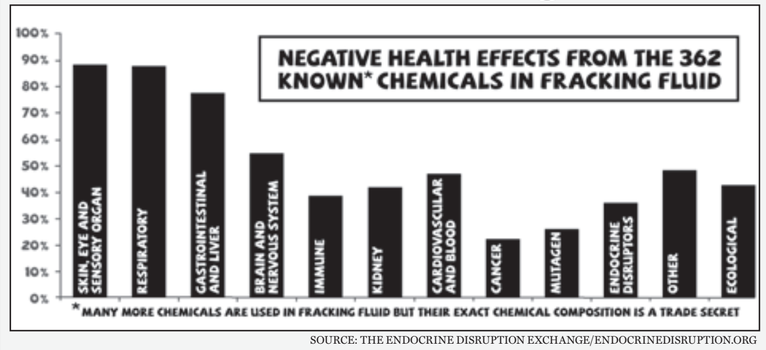
The chemicals in fracking fluid



SOURCE: THE ENDOCRINE DISRUPTION EXCHANGE/ENDOCRINEDISRUPTION.ORG

Fracturing fluid contains many toxic chemicals such as diesel fuel, benzene, ethylbenzene, toluene, xylene, naphthalene, polycyclic aromatic hydrocarbons, methanol, formaldehyde, ethylene glycol, glycol ethers, hydrochloric acid, and sodium hydroxide [1]. Even in small quantities, chemicals such as benzene are capable of contaminating millions of gallons of water, causing cancer and other health problems. Three hundred sixty-two chemicals involved in hydraulic fracturing were analyzed for potential health effects. The results of this analysis are illustrated in the graph below.

When fracturing fluid is pumped out of the ground after a fracturing operation, it contains radioactive minerals and salts that were formerly embedded thousands of feet below the surface of the earth [2]. Even chemicals that we don't think of as being harmful, like salts, will kill animal and plant life when they are concentrated. Naturally occurring radioactive material is harmless when it stays far underground, however, it may cause health problems when it is brought up to the surface of the Earth and disseminated into the environment [3].

One way we are exposed to fracturing fluids is through ingestion of contaminated drinking water. Ingestion could also occur if a person's food was grown or raised near fracturing operations where the local food and water supply was contaminated. If a cow drinks from a contaminated water source the chemicals can end up in meat that is later consumed by humans [4]. Exposure also occurs when chemicals and create air pollution. Air pollution is often invisible, odorless, and tasteless. As hydraulic fracturing becomes more prevalent in our region, reliance on dilution and inadequate treatment methods will result in more wide-scale problems with our water quality, food supply and ecosystems.

FOOTNOTES

1. U.S. Environmental Protection Agency. August, 2002. DRAFT Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs. EPA 816-D-02-006.
2. http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/PDFs/CCE_NatGas_Roadshow1a_2010_Final_.pdf
3. http://www.propublica.org/article/is-the-marcellus-shale-too-hot-to-handle-1109
4. http://www.propublica.org/article/16-cattle-drop-dead-near-mysterious-fluid-at-gas-drilling-site-430

because of the salt it contains.

Drilling site spills have made ground water unsafe to drink[18], and have also caused deaths and birth defects in animals. No one is measuring what effects the contamination has on animals or crops raised for human consumption.

What happens to the wastewater when it is hauled offsite is also very concerning. With the rapid expansion of Marcellus wells, the volumes of wastewater produced have far outstripped the capacity of existing industrial wastewater treatment plants in Pennsylvania.

In order to allow drilling to proceed, the DEP allowed municipal water treatment plants to accept wastewater, even though these plants were built to treat sewage and do not remove any of the chemical contaminants or salts in frackwater.

Existing commercial wastewater treatment facilities were also granted permits to accept frackwater. However, many of these were built to handle acid mine drainage or brine from shallow wells, which typically does not have as high concentrations of any of the contaminants as does Marcellus wastewater. Commercial plants do remove metals and oils, but cannot remove TDS or volatile organic compounds, and also do not specifically address fracking chemicals [6].

Comprehensive testing of frackwater for toxic contaminants is not required at any point in the disposal process. At municipal plants, the frackwater is simply diluted and pumped back into our waterways.

Drinking Water Impacted by Releasing Fracking Wastewater into Rivers

Rivers and streams are the sources of drinking water for the residents of Pittsburgh and most other cities and towns. During the several years that high volumes of Marcellus wastewater were legally disposed of into these waterways, evidence emerged of several threats to public health.

'Disinfectant byproduct' chemicals, which are harmful to our health, increased in many drinking water systems. Many people were exposed to unsafe levels of radionuclides, including barium, strontium, and radium [13, 15]. Downstream of disposal sites, chemicals in the wastewater can be hazardous to people swimming, fishing, or boating in the rivers and streams.

The high levels of bromides and chlorides found in fracking water react with drinking water disinfectant chemicals (chorine and chloramine) to create chemicals such as trihalomethanes. These 'disinfectant byproducts' (DBP) cause cancer and other health problems. Several of these DBPs are regulated by the EPA, and drinking water treatment facilities must test for them to ensure the EPA limits are not exceeded. However, not all DPBs are regulated, particularly those produced by the alternative disinfectant chloramine. When drinking water plants exceed DBP limits, they often switch to using chloramine instead of chlorine. However, the DBPs that chloramine produces are actually more harmful to our health [19].

In addition, chloramine is more corrosive, dissolving lead from pipes and rubber gaskets; this exposes people to lead in their water, and damages plumbing [19, 20]. Chloramine also causes skin rashes and problems for people on dialysis.

The radioactive elements in the water may pose a particular threat to health, and no comprehensive monitoring is being done to find out. According to the New York Times, a study of disposal of gas drilling waste into seawater off the coast of Louisiana found that it creates "potentially significant risk" for people eating the fish regularly; that waste was less concentrated than what is in Pennsylvania's rivers [13].

In 2010 the DEP established new regulations limiting the amount of TDS, barium, and strontium (radioactive elements) that can be discharged into surface waterways [5]. However, radium, a radioactive element that causes bone cancer when ingested, was not included in the 2010 regulations.

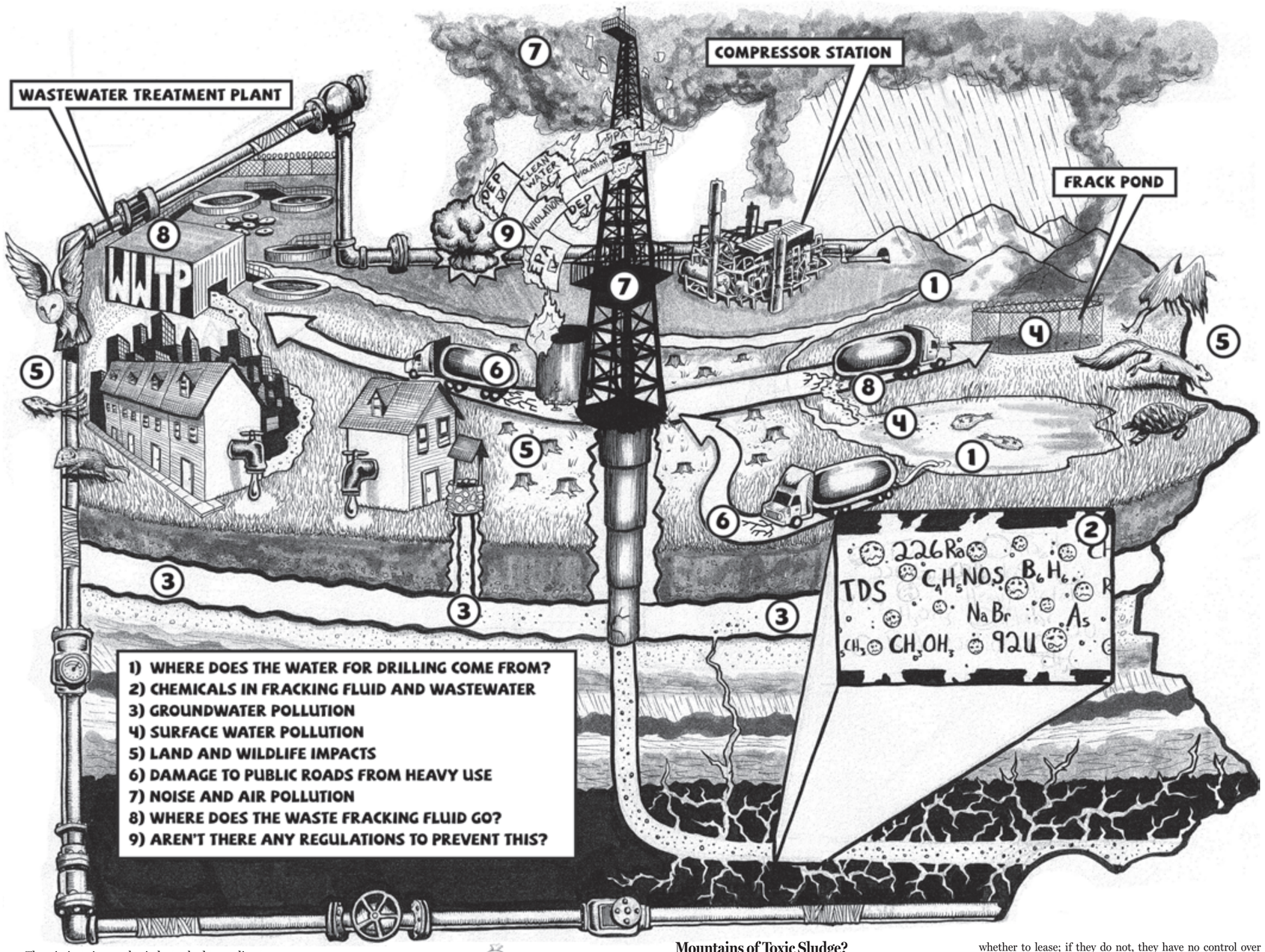
All new permits for accepting wastewater will have to satisfy these limits, which applies to newly constructed wastewater treatment plants or any existing plant that applies to increase its load of Marcellus wastewater. However, the existing permits were unaffected by the DEP's new rules. As long as drilling companies continued to supply the same volumes of wastewater, the TDS levels seen in 2010 could continue. Furthermore, the DEP regulations do not address all of the contaminants found in the wastewater [14].

Ecological Impacts

The TDS pollution from fracking wastewater essentially turns fresh water into salt water. Pennsylvania's freshwater ecosystems – our fish, mussels, salamanders, and the food chain that supports them - cannot survive in salt water. The death of all aquatic life in Dunkard Creek (a large tributary to the Monogahela River that flows through Greene County) in September 2009 is an example of the kind of problem we will face more of as drilling expands. The salinity level of Dunkard Creek was raised above ocean water by the combination of freshwater water withdrawal and disposal of gas drilling wastewater; this allowed a toxic species of saltwater algae ("golden algae") to fill the creek [21].

The Future of Frackwater?

In the second half of 2010, DEP figures show that Marcellus drillers generated about 5.4 million barrels of wastewater. Over half of the wastewater went to water treatment plants that discharge into rivers or streams; 2 million barrels were recycled or retreated without being expelled into waterways, and 460,000 barrels were sent to underground injection wells in Ohio [22]. In May 2011, the DEP asked drillers to voluntarily cease bringing wastewater to municipal treatment plants that can't treat it.



Thus, in just six months, industry had to re-direct over half of the total wastewater volume it produced. Although the Pennsylvania DEP claims that industry has complied with their request, there is still no requirement for comprehensive tracking of the wastewater, so no one knows yet exactly where it is going.

It is likely that the amount of wastewater being disposed of in underground injections wells has increased. Pennsylvania's geology is unsuitable for underground injection wells, but wastewater is shipped to Ohio and West Virginia, where this type of disposal is permitted. These wells are regarded as slightly safer than surface disposal, but are not without risks. A government report shows that they can leak and contaminate drinking water if they are improperly sealed or if they crack [23]. Furthermore, disposal of frackwater into injection wells in Arkansas has been linked to hundreds of small earthquakes [24]

Many larger drilling companies are now claiming they are recycling much of the flowback water they produce. Industry sources say an average of 20% of frackwater comes back to the surface; to "recycle" this water, they dilute it with freshwater and use it to frack other wells. At some point, however, it accumulates so much salt and other dissolved solids that it cannot be recycled any further.

The highly contaminated water must then be disposed of. Furthermore, drillers now store the flowback water between frack jobs in large open-air ponds that residents say expose them to noxious fumes [25]. Most companies only recycle the water for the first couple of years, but wells continue to produce lower volumes of waste for decades to come, and the toxicity increases over time [26].

Plans are also now underway to build new commercial plants to treat Marcellus wastewater. Because these must meet the DEP standard to remove most of the TDS, the new plants will use energy-intensive distillation or reverse osmosis treatment processes. Because this process vaporizes many of the toxic chemicals, the plants may pose serious air pollution hazards.

Many companies are dumping wastewater illegally because it is cheaper to pay fines than to pursue legal water treatment when so few options exist...

There are also reports that Pennsylvanian wastewater is now being sent to municipal treatment plants in New York state, which does not have any regulations restricting this practice.

Of the several options now being pursued to treat or dispose of the massive volumes of Marcellus wastewater, none are without substantial risk. Although rivers and streams are now no longer the primary destination of Marcellus wastes, this kind of disposal is still legal. The DEP's 2010 regulations do not address all the contaminants in the wastewater. If neighboring states tighten their regulations, surface disposal and the corresponding health risks could resurge in Pennsylvania.

Mountains of Toxic Sludge?

If wastewater is fully treated, solid waste or sludge is separated from the water. The composition of this sludge is not fully known - it certainly contains the metals and radionuclides removed from the water and may also contain organic compounds (benzene, etc.). A high volume of toxic substances once buried deep within the earth have been brought to the surface and must somehow be disposed of.

Cutting Costs - at Whose Expense?

Disregard for the weak existing regulations appears to be rampant within the drilling industry. Many reports of contamination have already emerged from drilling hotspots such as Dimock and Hickory.

The DEP does not have the capacity to inspect every well at every stage, and to date cannot even keep complete records of wastewater. In a one year period ending June 2010, the DEP could not account for 1/5 of the total volume of Marcellus wastewater produced—a missing 1.28 million barrels. [12]

Many companies are dumping wastewater illegally because it is cheaper to pay fines than to pursue legal water treatment when so few options exist [13, 27, 28, 29].

Currently documented illegal disposal methods include letting waste pits and and tanker trucks leak, and dumping diluted waste water into abandoned mine holes or directly into the waterways. [30] This can result in people unknowingly exposed to toxins in surface water, on their land, and in groundwater.

Land Use

Drilling may take place on public or private land. If the landowner also owns the mineral rights, they may decide whether to lease; if they do not, they have no control over the decision to drill. Well pads, compressor stations and waste pits are being constructed next to homes, schools, and summer camps; in our state forests and state game lands.

In Allegheny County, seven percent of the county's land area has been leased for Marcellus Shale exploration. Some counties in New York have leased over 40% of their land area. As hydraulic fracturing is a relatively new industry in southwestern Pennsylvania compared to New York, we can expect that more of our region's land will be leased.

Pennsylvania's remaining expanses of unbroken forests are also under threat from drilling, threatening songbirds, raptors, wild trout, and other species that depend on these habitats. Projections estimate that 7 to 16 thousand well pads will be created to accommodate 60,000 wells in the next 20 years [31]. A study that measured Marcellus development through 2009 found that each well pad takes up 3-5 acres, and associated roads, pipelines, and water storage ponds require an additional 6 acres.

When wells are established in forest settings, an average of 21 acres of surrounding forest loses habitat value for interior forest species [31]. The proliferation of wells across the state will increase forest fragmentation; unfortunately, the areas projected for high density of Marcellus development are also the regions with the most intact forest remaining, in the northcentral and southwestern portions of the state. As the forest is sliced into smaller pieces, intact habitats for wildlife disappear.

Public Assets (Roads)

While drilling presents opportunities for wealth for those leasing their land and for drilling companies, municipalities' capital assets will be impacted and the tax payers will subsidize the residual effects of gas extraction. The most direct implication for municipalities will be a decline in the quality of roadway and bridge composition and integrity, from high traffic of trucks with heavy loads.

The Department of Environmental Protection estimates that one Marcellus hydraulic fracturing well requires 1,000 truck trips per well. Wells can be fracked up to 10 times over decades, so drilling can continue to affect road quality and traffic patterns for an extended period of time.[32]

Air Pollution: Back to the Bad Old Days?

Drilling for natural gas deteriorates air quality in all phases of gas development — the drilling itself, well completions, hydraulic fracturing and pipeline operations. Huge amounts of diesel fuel are burned for trucking and running equipment. Hazardous air pollutants such as benzene and polycyclic aromatic hydrocarbons evaporate into the air at all stages of handling the gas and wastewater.

In Dallas and Forth Worth, where companies are drilling into the Barnett Shale, studies show that emissions of smog-forming compounds, volatile organic compounds, greenhouse gases, and air toxic chemicals from the oil and gas industry now exceed emissions from motor vehicles in that region [33]. Despite years of improvement, air quality in our region remains notoriously bad even without additional Marcellus pollution. Our current air pollution problems are correlated with higher than national levels of health problems such as asthma, cancer, and heart disease deaths[34].

Marcellus pollution could worsen these problems across our region to create a serious public health crisis. Furthermore, workers, and those who live in close proximity to drilling sites, compressor stations, wastewater treatment plants, or other related facilities are often exposed to particularly high levels of hazardous air pollutants. Studies conducted in western U.S. shalefields show that residents have many symptoms of poisoning from these compounds, sometimes resulting in disabling illnesses [35, 36].

Noise Pollution

Noise from oil and gas development comes from a number of sources: truck traffic, drilling and completion activities, well pumps and compressors. In Fort Worth, drilling pads and pumping stations have been constructed less than 300 feet from homes. For some landowners, noise from oil and gas operations is so loud that it makes them feel as if they are living in an industrial zone[37].

What About Regulations and Legislation?

Current regulations bear the impact of a long history of industries pouring money into lobbying organizations, in order to obtain exemptions from environmental regulations and pass legislation that favors their industry's interests.

While Bush and Cheney were in office they succeeded in creating an exemption for horizontal hydraulic fracturing, a drilling method developed by Cheney's former employer, Halliburton [41]. The 'Halliburton loophole' specifically stipulates that hydraulic fracturing is not subject to regulation under the Safe Drinking Water Act. This exemption has been justified by saying that existing state regulations and oversight are adequate. However, Pennsylvania's oil and gas laws were written to regulate conventional natural gas drilling, a process that has gone on in the state for decades.

The industry also eschews more stringent regulation claiming that hydraulic fracturing does not pose a threat to human or environmental health. In spite of documented cases of groundwater contamination near hydro-fracked wells[41] the EPA completed a study in June 2004 wherein it concluded that there was no evidence that hydraulic fracturing posed a threat to drinking water[39].

Several EPA employees expressed concerns about the validity of the study, including Weston Wilson, senior environmental engineer and 30-year EPA veteran, who stated: "EPA produced a final report... that I believe is scientifically unsound and contrary to the purposes of the law" [40]. The Environmental Protection Agency is beginning another study of the relationship between hydraulic fracturing and drinking water which is slated for completion in 2012.

However, *The New York Times* has documented that EPA employees' concerns about health and safety continue to be suppressed in many situations [40]. Meanwhile, hydraulic fracturing in the region is growing exponentially.

The gas companies frequently claim that their industry is well regulated, and that well pads receive frequent inspections, so we should stop worrying about the impacts of this industry. It is important to keep in mind that having regulations in place does not mean that companies follow them.

There are 31 DEP inspectors for 125,000 Marcellus wells in Pennsylvania [13]. Even at this limited capacity, inspectors have found an alarming number of violations. The Pennsylvania Land Trust Association did a study revealing that "DEP records show a total of 1,614 violations of state Oil and Gas Laws due to gas drilling or other earth disturbance activities related to natural gas extraction from the Marcellus Shale" between January 2008 and August 2010 [27].

Finally, industry leaders are attempting to pass legislation that would enact "forced pooling" of mineral rights. Laws like this exist in other states and stipulate that once a certain percentage of your neighbors lease the mineral rights under their property, your mineral rights become leased as well, with or without your consent[43].

The intertwined relationships between governmental leaders and gas companies enable industries with large sums of money to write and pass legislation that maximizes their profits while reducing their regulatory headaches. This flaw in our political system takes the power out of the hands of ordinary people and puts it in the hands of a small elite group of rich and powerful people.

THE RAVAGED LANDSCAPE OF THE SHALEFIELDS: THIS OBLIQUE LOW-ALTITUDE AERIAL PHOTO SHOWS WELLPADS, ACCESS ROADS, PIPELINE CORRIDORS AND OTHER NATURAL GAS INFRASTRUCTURE IN THE JONAH FIELD OF WESTERN WYOMING'S UPPER GREEN RIVER VALLEY. (PHOTO: BRUCE GORDON/WWW.ECOFLIGHT.INFO)

Testimonies from the shalefields

On July 22nd, 2010, more than 2,000 people packed a Canonsberg, PA, hall to attend an EPA hearing on Marcellus Shale drilling. Concerned people from Pennsylvania, New York and West Virginia testified for over four hours. Here are some of their voices.

Rebecca Scirpen

"During the summer of 2007 a gas well was drilled 800 feet from our house. The cement casing blew up when the gas well was fracked. We noticed changes in the taste and smell of our water. Our family experienced sinus infections, abdominal cramping, diarrhea, rashes, and excessively dry skin....The DEP had the drilling company supply us with drinking water for two months after elevated levels of several elements and *E. coli* were found in our well water. We contacted the drilling company and the DEP again in 2007 for our water discoloration. The drilling company and the DEP tested our water again and claimed our water had settled and was fine. We have been buying drinking water since; we do not believe our water is safe as we still experience off odors, sliminess and excessively dry skin.... We must have fresh, clean water to sustain life. I feel my family's health and safety is at risk."

Carol Jean Logan

"My father ingested well water that was laced with frack fluid. It had 1.8 milligrams of methane and 30 milligrams per liter of chloride in the water. He was on a catheter because he had suffered a stroke. We had to pump into him one liter of fluid into him a day.

The people up above that had Atlas as their drilling company did not tell us that our water was poisoned. I drank it – I threw up fluorescent yellow fluid.

I have scars on my face, three layers of makeup, holes in my skin, my legs, my arms, everywhere—due to the fact our water was contaminated by frack fluid from Atlas energy...

My father was embalmed. His body did not even burn – there are twenty five pounds of ashes in my mother's hallway. Explain that to an 89 year old woman that has to boil her water, can't take a shower, can't wash clothes, can't turn on her furnace, can't turn on her water. Explain that."

Terry Davin

"Almost a year ago, Greene County was dealt a great environmental disaster. Forty-three stream miles of Dunkard Creek were poisoned. And as a result, thousands of fish, mussels, snails, and all other aquatic life, are dead. They were decaying along the banks of a once-vibrant stream.

Dunkard Creek survived, barely, a century of room-and-pillar coal extraction, and currently longwall mining. With the help of watershed groups, sportsmen's clubs, and volunteers from the local community, it has endured. But in less than nine short years of the 21st century, it was murdered by the new age of energy. Toxic byproducts of the natural gas drilling industry, both coalbed methane, and Marcellus waste.

The poisoning of this stream was a crime against our water supply and our community that will have long term economic, social, and environmental repercussions for generations to come. But for now, what are we, as well as our nation, willing to sacrifice for energy? Will it be our children, or our elderly next? Rotting, decayed corpses of dead fish laid testament to the lack of enforcement by state and federal agencies to protect Greene County's citizens and our water supply. How many times does our county have to be disrespected, violated, and our quality of life diminished by industrial acts that harm the very people that rely on the Monogahela River for their drinking water?"

Living with nearby drilling

"In August, our dog died. Well, our neighbor's dog had died first. And it was just unusual, because he was only about a year and half old, and whenever he got sick, they couldn't figure out what was wrong with him, and they took him to the vet and they drew some lab work...[the vet] said he had ethylene glycol and arsenic in their dog. And the vet said, 'Do you think someone could be poisoning your dog...?'

The dog ended up dying...just a couple weeks later, our dog died.

In September our neighbors had lost some puppies, they had a couple of litters of puppies that had died, and then in October their horse got really sick. They had their vet come out to do some evaluations and they found ethylene glycol in their horse. That's when we started putting two and two together"

Jodie Burrell

"This contaminated frackwater is routinely seen being dumped in many of our backyard creeks. People are not educated on who to contact when they see these atrocities.

Who does one call when they see the residual waste trucks dumping frackwater into our streams in Uniontown, Mariana, Waynesburg, Library, and famously into Dunkard Creek and many other streams?

There is no one to call. By the time someone gets there the actor is gone...."

Marilyn Heights

"My well is contaminated. We are running out of time, our water has been contaminated with cyanide, benzene, toluene and other deadly chemicals.

We need to stop the dangerous practice called frack drilling and protect our lives and our natural resources...

Our rights are being violated by these frack corporations. In 2009 the state of West Virginia failed to test drinking water. We began a voluntary program testing for volatile organic contaminants. The results are shocking and frightening. Corporations have been allowed to poison water and contaminate land.

The secondary drilling waste has been spread on public roads and into major rivers. The highways and roads leading to these frack sites have been damaged and destroyed... Workers are dying; sites are unregulated, chemicals and silica are causing cancer, tuberculosis, and silicosis. We are running out of time. To live, we must have clean water to drink and air to breath."

Faith

"I'll remind you of the three threes: you can go without air for three minutes, you can go without water for three days, you can go without food for three weeks, you can go without natural gas for a lifetime.

Please do not allow outside interests to come to southwestern Pennsylvania, rape our resources, take their money and go home, and leave us with the environmental degradation the coal industry has done for so many years."

SHALEFIELDS GRASSROOTS
REPORTER

Our Team

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Marcellus Protest and Shadbush Environmental Justice Collective

This broadsheet was brought to you by...

The Shalefields Grassroots Media Project, a joint project of the Shadbush Environmental Justice Collective and the Pittsburgh Independent Media Center. Through print, video, audio and web-based media we hope to amplify voices from the grassroots of the gaslands to collect stories from those affected by natural gas drilling, and train people to report on the impacts of shale gas drilling in their communities throughout our region. Contact us at (412) 444-FLOW (3569) or info@indypgh.org.

The Pittsburgh Independent Media Center is an all-volunteer organization dedicated to grassroots, community produced journalism. We broadcast stories from the Shalefields Grassroots Media Project, as well as other news, on Rustbelt Radio, which airs on WRCT 88.3 FM in Pittsburgh Mondays at 6PM andTuesdays at 9AM. Rustbelt Radio is also available on the internet, both on WRCT's live webstream at wrct.org and for download, stream or podcast from our website at radio.indypgh.org.

(PHOTO: MARCELLUSPROTEST)

The Shadbush Environmental Justice Collective works to confront the root causes of ecological destruction, climate change and oppression. We are committed to building community-based, radically sustainable solutions that foster local autonomy and self-sufficiency in Pittsburgh and its bioregion. Visit us online at shadbushcollective.org.

The shadbush (*Amelanchier arborea*) is a small tree in the rose family, native to eastern North American deciduous forests. The common name arose because it flowers in early spring at the same time the Atlantic shad fish migrated up the rivers to spawn. Shad were once plentiful in the rivers of eastern North America, and were an important food source for Native Americans and early settlers. However, shad have declined precipitously in recent decades, because of river pollution and dam-construction.

Amelanchier arborea

The shadbush's berries ripen in June (hence another common name "Juneberry"). Native Americans used the berries in pemmican and stews, and also medicinally to strengthen women after childbirth. The shadbush is a familiar feature in urban landscaping because of its attractive white flowers and small, graceful stature.

The Shadbush Collective adopted this tree as our namesake as a symbol of the interdependence of human life and the natural world.

MARCELLUS SHALE PROTEST

Marcellus Protest is an alliance of western PA groups & individuals building a broad movement to stop the destruction of our environment and communities caused by Marcellus Shale gas drilling as well as to support other directly affected communities.

MarcellusProtest.org is a clearinghouse of citizen-interest information on shale gas drilling, with a calendar of events, downloadable resources, news and views. The group also maintains a citizen's speakers bureau available for community meetings or other events.

Marcellus Protest has organized rallies and other actions to demonstrate citizen opposition to shale gas drilling's negative affects, such as the November 3rd, 2010 protest in downtown Pittsburgh, actions to support the City of Pittsburgh's ban on drilling, and organizing to bring western Pennsylvanians to protests in Harrisburg.

Currently we are also engaged in education and outreach about shale gas drilling and its effects, support of other local community groups through resource-sharing, and coalition building to broaden the movement.

Contact us at (724) 485-9835 or info@marcellusprotest.org and visit our website at marcellusprotest.org.

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From understanding the issues to taking action...

Where does my water come from?

You either have well water or municipal water. Well water is groundwater, and municipal water comes from streams and rivers. If you have municipal water you should receive an annual water quality report in the mail each year. Some companies also put their data online here: http://cfpub.epa.gov/safewater/ccr/index.cfm or you can contact them directly to request it.

The Associated Press created an interactive map that allows you to follow your water from the wastewater plant to your tap: http://hosted.ap.org/specials/interactives/_national/marcellus-water/ (totals no longer current)

Penn State University has compiled data on watersheds in Pennsylvania which can be found at their PA Watersheds Data System site: http://www.pawatershedsdatasystem.psu.edu.

How can I get my water tested?

The Mountain Watershed Association has information on water testing that can be found here: http://www.mtwatershed.com/marcellus.html or you can call them: (724) 455-4200. ShaleTest.org is working to provide water, air, and soil tests to people who may be impacted by natural gas but could not otherwise afford the tests. You may visit their website or call them: (530) 237 4558

What do I need to know about leasing?

Mountain Watershed Association publishes a landowner's toolkit that provides in-depth information about leasing concerns and legal issues. Download the kit directly at tinyurl.com/landownertoolkit

Online resources & news sources

MarcellusProtest.org is a clearinghouse of citizen-interest information on shale gas drilling, with a calendar of events, downloadable resources, news and views. The group also maintains a citizen's speakers bureau available for community meetings or other events.

Find information about corporations that are drilling in Marcellus at http://shadbushcollective.org/?page_id=204.

The **Endocrine Disruption Exchange** provides information on the chemicals used in hydraulic fracturing and their health effects. TEDX was founded by Dr. Theo Colburn, a pioneering researcher into the health effects of chemicals in our environment: endocrinedisruption.com.

FracTracker is a website managed by the University of Pittsburgh's Center for Healthy Environments & Communities (CHEC). It allows users to upload and share data related to shale gas drilling, such as permit locations, permit violations, water testing results, and more. Users can also view the data on maps, and important new developments are often summarized in blog posts. www.fractracker.org

ProPublica is an independent, non-profit newsroom that produces investigative reporting in the public interest. Their ongoing series of articles about gas drilling provides a wealth of information: www.propublica.org/series/buried-secrets-gas-drillings-environmental-threat

The New York Times has published a series of investigative reports on the impacts of drilling.

Bob's Blog, by Hickory resident Bob Donnan, combines eyewitness experience with drilling in southwestern Pennsylvania with good research about the impacts of the process. Lots of good photos as well! www.donnan.com/blog.htm

Check out the footnotes on page 7, where you can find references to the original sources of everything we've printed.

Our resources becoming their profits: Breaking the cycle of exploitation

By Patrick Young

Hydraulic fracturing in the Marcellus Shale is already having devastating effects on our communities and our shared environment, so how are we going to stop it?

The gas industry is too big and too powerful for any of us to end it on our own. They have money, politicians, lawyers, and public relations hacks all at their disposal and they're committed to turning our shale into their profits. However, drilling for fuel is a complicated process where many parts need to line up for these companies to succeed in extracting our resources for their vacation homes.

If drilling is going to happen in our communities a whole host of factors need to come together, all at the same time. The gas companies need our politicians to fail to put forward effective and appropriate legislation, the regulatory agencies need to stop short of holding the gas companies accountable, and the companies need financial and economic power. The gas industry needs considerable support to push it's public agenda and keep us and our neighbors complicit in their drilling scheme. Landowners need to sign leases and the gas companies need to build a massive drilling infrastructure—constructing drilling rigs and well pads, building thousands of miles of pipelines, trucking in millions of gallons of water and chemicals and disposing of their waste.

We can think of each one of these factors like a spoke on a bike wheel. As we start to knock out, or at least destabilize some of the spokes, the wheel starts to wobble – the drilling apparatus becomes a little unsteady. If we knock out or destabilize enough of the spokes, the wheel collapses and can't keep rolling forward: drilling stops altogether..

This isn't a new plan or strategy. People across the region have been knocking away at each of these spokes for years. The key is to understand how all of the pieces fit together and support each other working on as many of them as we can. If each of us knocks away at the spoke that makes the most sense to us, we'll make the gas drillers wobble and eventually stop them in their tracks!!

Regional listing of groups active around Marcellus Shale drilling issues

Northwest PA

Allegheny Defense Project
www.alleghenydefense.org
Nonprofit dedicated to the protection of the natural heritage of the Alleghenies and the Allegheny National Forest (ANF).

Marcellus Outreach—Butler
www.MarcellusOutreachButler.org
The group "provides a strong, credible voice to protect the health and safety of our communities from the effects of the natural gas drilling" through outreach, education & action.

Southwest PA

Beaver County Marcellus Shale Organizing Committee
tinyurl.com/BeaverCountyMarcellus

Center for Coalfield Justice
www.coalfieldjustice.org
A non-profit based in Washington, PA whose mission is education, assisting citizens' efforts to defend their rights, and working to improve and enforce laws and public policy.

Group Against Smog and Pollution
www.gasp-pgh.org
A nonprofit citizens' group in Southwestern PA, focused on environmental education, litigation, and policy especially related to air quality in the Pittsburgh region.

Lincoln Place Action Group (Pittsburgh)
www.lpactiongroup.com
A group focused on providing information and action regarding natural gas drilling in the Lincoln Place neighborhood in Pittsburgh, PA.

Marcellus Protest
www.marcellusprotest.org (724) 485-9835
An alliance of western PA groups & individuals building a broad movement to stop the destruction of our environment & communities.

Mountain Watershed Association
www.mtwatershed.com (724) 455-4200
Nonprofit concerned with the conservation, restoration and protection of the Indian Creek Watershed in Westmoreland and Fayette Counties. The Marcellus Citizen Stewardship Project provides citizens with tools and knowledge to monitor drilling.

Murrysville Marcellus Community Group
www.shalethreat.com (412) 596-0066/(724) 327-2767
This is a group specifically for the exchange of information and ideas for Murrysville community members who are working on banning fracking in Murrysville.

Peters Township Marcellus Shale Awareness
www.ptmsa.com

Pittsburgh Student Environmental Coalition
pittsburghsec.wordpress.com
PSEC is a collective of youth-run environmental organizations working to promote positive environmental change in Pittsburgh and beyond.

Shadbush Collective
www.shadbushcollective.org
Confronting the root causes of ecological destruction, climate change and oppression in Pittsburgh and its bioregion.

Sierra Club Allegheny Group
www.alleghenysc.org
Local branch of national group, protecting communities, wild places, and the planet itself since 1892.

Three Rivers Waterkeeper (Pittsburgh)
www.threeriverswaterkeeper.org (412) 589-9411
Protecting waterways throughout Southwestern PA through water sampling, discharge & use permit review, community engagement, and active investigation of water threats.

Upper Burrell Citizens Against Marcellus Pollution
ubcamp@gmail.com (724) 337-7470

Westmoreland Marcellus Citizens
westmorelandmarcellus.blogspot.com
A grassroots group working to pass ordinances and bans in local municipalities, and also on education and outreach.

Western/Central PA

Pennsylvania Alliance for Clean Water and Air
www.pacwa.org
A group of concerned citizens in Western PA "raising awareness of the dangers of hydraulic fracturing on public health and the environment."

Northeast PA

Chenango Delaware Otsego Gas Drilling Opposition Group
www.un-naturalgas.org
A representative organization working in the areas of action, education, and strengthening local government's ability to protect communities.

Damascus Citizens for Sustainability
www.damascuscitizens.org
A grassroots nonprofit dedicated to protecting the Upper Delaware River Basin and beyond from the ravages of deep-shale gas extraction.

Delaware Riverkeeper Network
www.delawareriverkeeper.org (215) 369-1188
A nonprofit membership organization working on environmental advocacy, volunteer monitoring, stream restoration, public education, and litigation to enforce environmental safety laws.

Gas Drilling Awareness Wyoming/Lackawanna County
gdacwyominglackawanna.blogspot.com

Gas Drilling Awareness Coalition
www.GDACoalition.org
GDAC (for Luzerne County based in Dallas, PA) is a nonprofit community educational association concerned with the negative effects of drilling for natural gas in PA.

Gas Truth
www.gastruth.org
A grassroots community group fighting gas drilling, currently with chapters in Berks, Lehigh Valley & Central PA.

NEPAGasAction
www.nepagasaction.org
Information and action to protect our home from the negative effects of natural gas drilling and fracking. Created by the Susquehanna county–based Citizens for Clean Water.

Responsible Drilling Alliance
www.ResponsibleDrillingAlliance.org
Grassroots, all-volunteer coalition for education and advocacy, based in Lycoming county. RDA supports a drilling moratorium and advocates for the protection of the economy, environment, health, safety and quality of life.

Statewide & National Groups

Clean Air Council (Philadelphia)
www.cleanair.org
A member- supported, non-profit environmental organization dedicated to protecting everyone's right to breathe clean air.

Clean Water Action PA
www.cleanwateraction.org/pa
Nonprofit whose work includes grassroots organizing, expert policy research and political advocacy focused on holding elected officials accountable to the public.

Community Environmental Legal Defense Fund
www.celdf.org
Works to facilitate passage of Community Rights Ordinances banning fracking at the municipal level. Legal and organizing services available to community groups and municipal governments.

Earthworks (national)
www.earthworksaction.org/hydfracking.cfm
A Washington, DC-based nonprofit protecting communities and the environment from the destructive impacts of mineral development. Comprehensive information on fracking available on their website.

Penn Environment
www.pennenvironment.org
Staff and volunteer-based advocacy nonprofit.